



# AUXILIARY RELAY

## Type HFA60C

### DESCRIPTION

#### INTRODUCTION

The Type HFA60C relay is an instantaneous, hinged armature, auxiliary relay having two electrically separate contact circuits suitable for either circuit opening or circuit closing application. This relay is designed for use with the BBA pilot wire check relays to obtain a transfer trip function. The relay is available for back connection only, but can be furnished for either surface mounting or semi-flush mounting.

#### APPLICATION

Because the HFA60C relay is insulated for 10,000 volts between its contact and coil circuits, and because of its 0.75 cycle operating time, it is particularly well suited for transferred tripping applications over pilot wires in conjunction with the BBA11A relay.

Fig. 2 illustrates how the HFA60C is used in a transformer differential transferred tripping scheme. The rectifier permits the HFA to be energized directly from the BDD relays but it prevents the single HEA51 normally open contact from having to interrupt its own coil circuit when the relay is being reset. Since the HFA60C is continuously rated at the utilization voltage, it is maintained in the operated position until the HEA51 relay is reset. This insures a positive and continuous transferred tripping signal.

**CAUTION:** In pilot wire schemes it is possible for high voltages to appear between the pilot wires and ground at either or both terminals. These voltages are usually due to differences in station ground potential but may also be due to longitudinal induction if the pilot wires are run parallel to and near power lines for any distance. Since the HFA relays are connected directly to the pilot wires, parts of the relay will be the same potential as the pilot wires, and the necessary precautions should be observed when inspecting the relay or testing it in place.

*These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.*

#### CHARACTERISTICS

The Type HFA60C relay is a self-reset relay designed for instantaneous operation on both pick up and drop out. The coil circuit is designed for use with an external resistor and capacitor (supplied with relay) to provide a pick up time of less than 0.012 seconds at rated voltage.

The relay is designed to withstand for 1 second a hipot voltage of 10KV RMS between the two contact circuits, between contact circuits and coil circuit, and between the contact circuits and frame. The relay will not withstand the 10KV RMS hipot across the contact gap.

Unless the relay is ordered with a specific contact arrangement, it will be shipped with circuit closing contacts (code 20). The contact arrangement can be easily changed to provide any of the combinations shown in Table I.

TABLE I  
CONTACT CODES

CODE NO.	20	11	02
POS. NO.	CONTACT ARRANGEMENT		
1	a	a	b
6	a	b	b

#### RATINGS AND BURDENS

The Type HFA60C relay is available for continuous operation at 125 or 250V DC. The continuous operating circuit rating is based on the combination of coil and externally mounted capacitor and resistor.

LOW VOLTAGE SWITCHGEAR DEPARTMENT

# GENERAL ELECTRIC

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**GEI-74667 Auxiliary Relay Type HFA**

The current closing rating of each contact is 30 amperes. The current carrying rating is 12 amperes continuous or 30 amperes for 1 minute. Table II lists the non-inductive interrupting capacity of each contact.

The burden of the operating coil circuit is 33 watts at the rated DC voltage shown on the name-plate.

**TABLE II  
CONTACT INTERRUPTING RATING**

D-C		A-C	
VOLTS	AMPERES	VOLTS	AMPERES
12	10	115	15
24	5	230	10
32	3	460	5
48	2	575	--
125	0.75	---	--
250	0.25	---	--

**INSTALLATION**

**LOCATION**

Since the HFA relays are connected directly into the pilot wire circuit which may be subject to high voltages to ground, it is recommended that the relay be located as near as possible to the point where the pilot wires enter the building in order to confine the hazardous voltage to as small a part of the station as possible. The location should also be clean and dry, free from dust and excessive vibration, and well lighted to facilitate inspection and testing.

**MOUNTING AND CONNECTIONS**

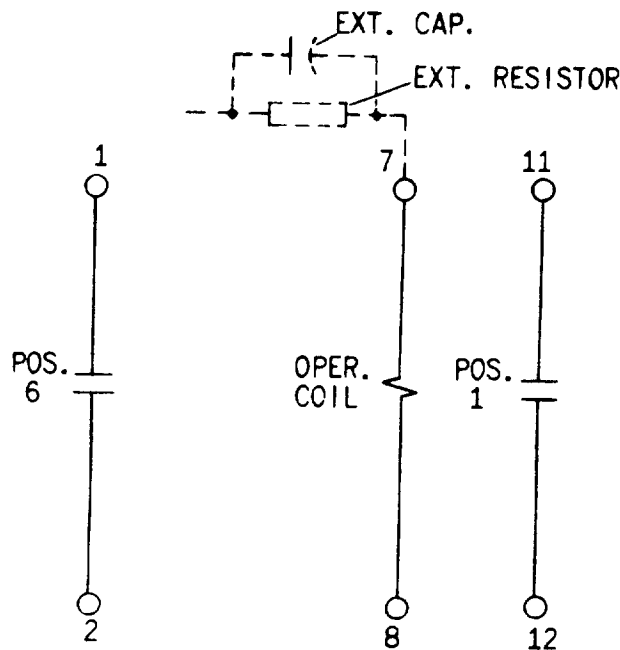
The HFA60C relay should be mounted on a vertical surface. The outline and panel drilling

diagrams are shown in Figs. 5 and 6. Surface mounting on steel panels requires an insulating bushing for each terminal. The outlines of the external capacitors and resistor are shown in Figs. 3 and 4 respectively.

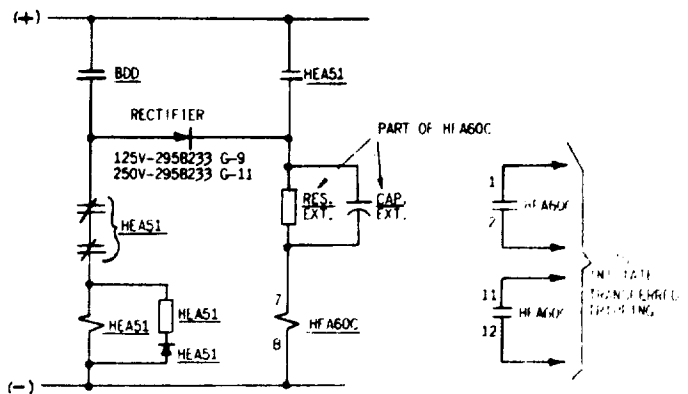
The internal connection diagram for the HFA60C relay is shown in Fig. 1 and a typical external connection diagram is shown in Fig. 2.

**ADJUSTMENTS**

These relays have been calibrated at the factory and no further adjustments are necessary. If the relays should need adjustments, refer to the **MAINTENANCE SECTION** of this book.



**Fig. 1 Internal Connection Diagram of HFA60C Relay (Back View)**



**Fig. 2 Typical External Connection Diagram Using HFA60C Relay in Pilot Wire Transferred Tripping Scheme**

Fig. 1 (0127A9536-0)

Fig. 2 (0127A9535-0)

# MAINTENANCE

## CONTACTS

### CLEANING

In cleaning fine silver contacts a flexible burnishing tool should be used. This consists of a flexible strip of metal and an etched roughened surface, resembling in effect, a superfine file. The polishing action is so delicate that no scratches are left yet corroded material will be removed rapidly and thoroughly.

Fine silver contacts should not be cleaned with knives, files or abrasive paper or cloth.

The burnishing tool described is included in the standard XRT11A relay tool kit obtainable from the factory.

### ADJUSTMENT

The contacts should not require readjustment since they are self-aligning.

Any contact circuit can be changed from circuit opening to circuit closing, or vice versa, by

removing the fixed contact, turning it over and replacing it. (See Table.) After the change the contacts should be checked to see that all circuit closing contacts make simultaneously when the relay is operated by hand, and that all circuit opening contacts reclose simultaneously when the relay is allowed to drop out. All moving contacts should have at least 3/64 inch wipe when in their operated position. It may be necessary to bend the moving contact arms to realize these requirements.

## ELECTRICAL TESTS

To adjust the Type HFA60C for the shortarmature gap characteristic of this relay, pick up the armature by hand to the position where the normally open contacts just make. Then turn the back stop screw clockwise until it touches the armature surface. Then back the screw off two full turns. The tension of the control spring should be adjusted so that the relay picks up at 40% of the DC nameplate rating. Pick up voltage should be measured across the entire operating coil circuit including external capacitor-resistor as well as the coil. Pick up should be checked by gradually increasing the applied voltage.

Fig. 3A (104A8916-0)

Fig. 3B (104A8915-0)

Fig. 4 (389A752-0)

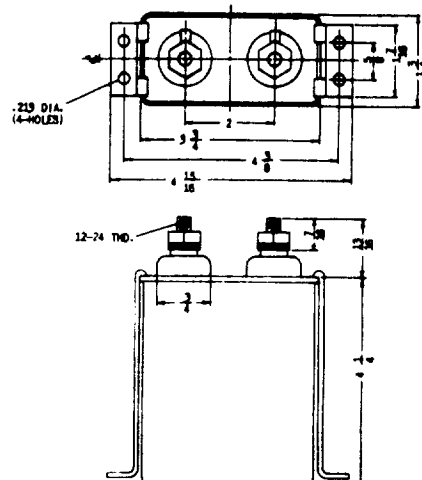
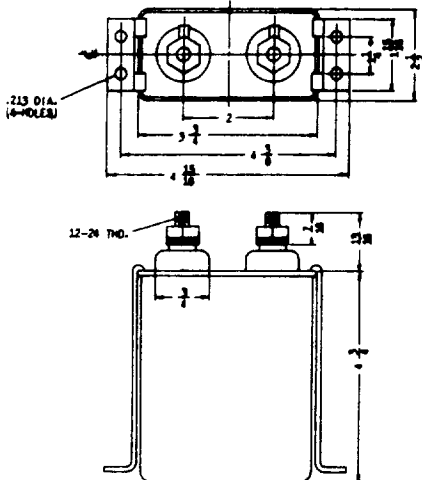


Fig. 3A Outline of External Capacitor Used With Relay Rated 125V DC

Fig. 3B Outline of External Capacitor Used With Relay Rated 250V DC

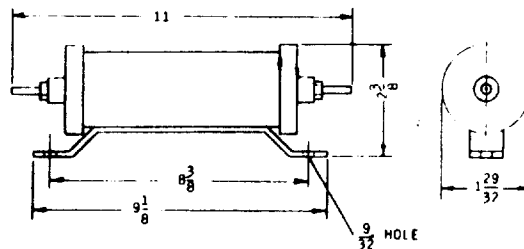


Fig. 4 Outline of External Resistor Used With HFA60C Relays

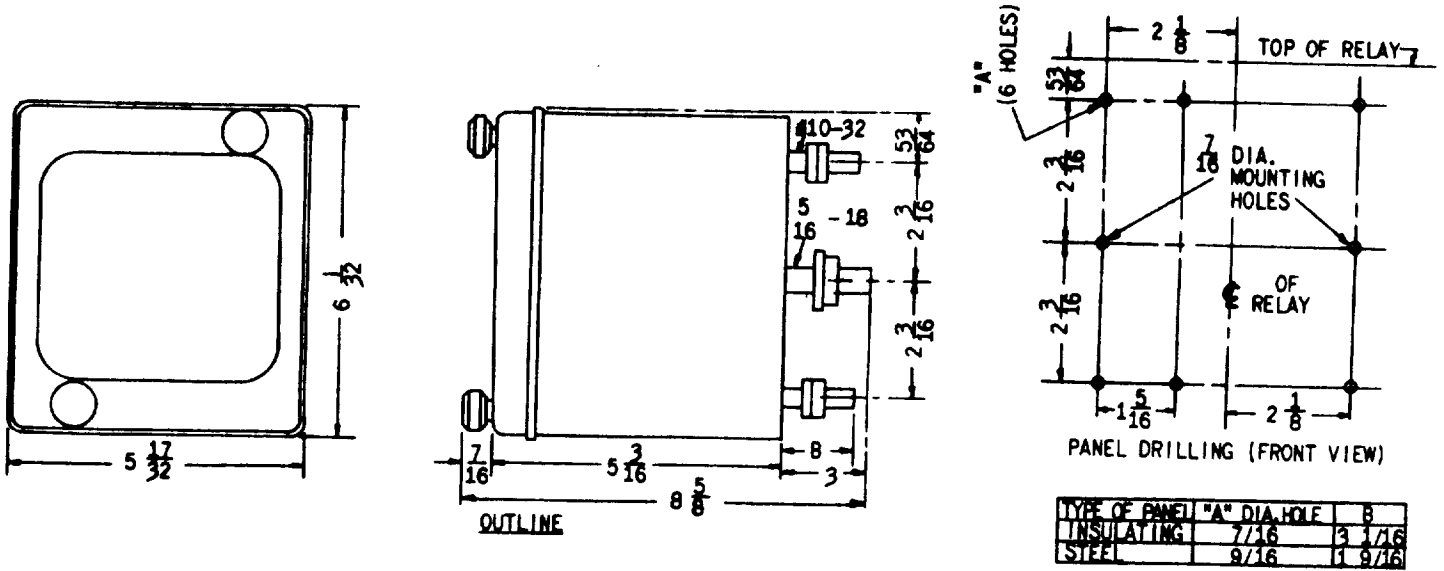


Fig. 5 Outline and Panel Drilling Diagram For Surface Mounted HFA60C Relay (Typical Model Number is HFA60C(-))

Fig. 5(0127A9537-0)

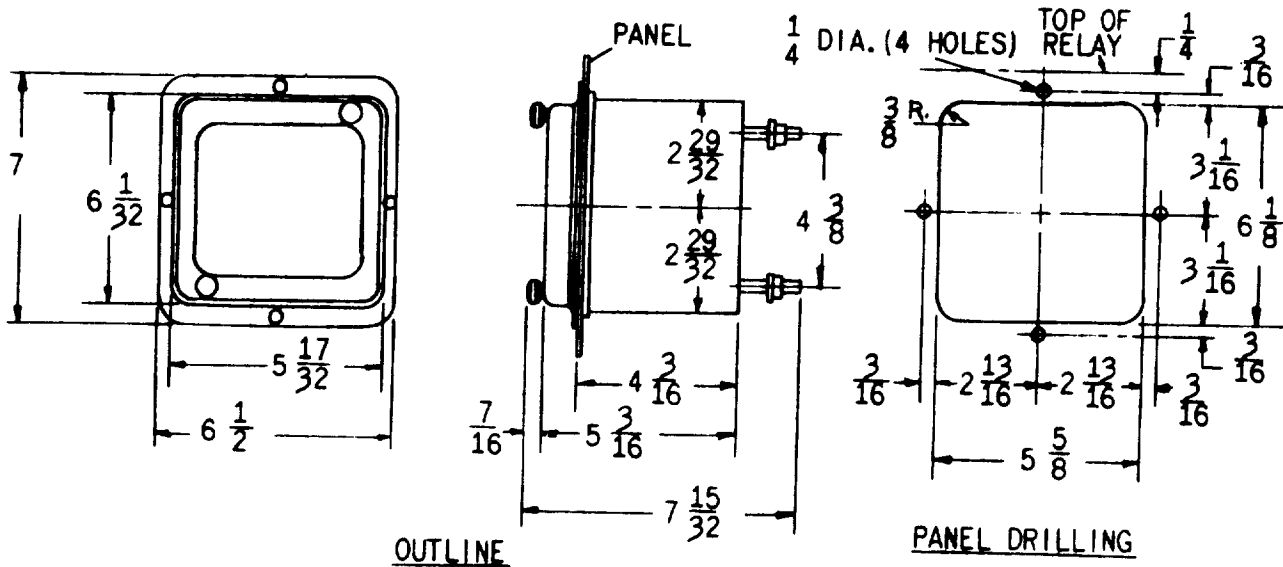


Fig. 6 Outline and Panel Drilling Diagram For Semi-Flush Mounted HFA60C Relay (Typical Model Number is HFA60C(-)F)

Fig. 6(0127A9538-0)